



## SHORT REPORT

# Endovascular Percutaneous Treatment of Tuberculous Pseudo-aneurysm Involving the Coeliac Artery: A Case Report

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### KEYWORDS

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**Abstract** Pseudo-aneurysms involving the coeliac artery caused by tuberculosis infection are extremely rare and are highly susceptible to rupture.<sup>1</sup> It's difficult to make the correctly diagnosis preoperative and select reconstructive procedures. We report a case of tuberculous pseudo-aneurysm in the abdominal aorta involving the coeliac artery. The active phase of the tuberculous makes it impossible to perform open surgery, so endovascular percutaneous treatment was performed, inflow to the pseudo-aneurysm was excluded by placing a custom-made stent graft at the coeliac artery orifice. The patient recovered very well and was prescribed anti-tuberculosis treatment for up to 6 months. Endovascular repair for tuberculous pseudo-aneurysm may be a life-saving option, covering the coeliac artery with stent graft is considered safe and suitable.

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Pseudo-aneurysms, involving the coeliac artery caused by tuberculosis infection, are extremely rare and open surgery possesses high risks and mortality.<sup>1</sup> We report a case of tuberculous pseudo-aneurysm in the abdominal aorta involving the coeliac artery, which was successfully repaired using an endovascular stent graft.

### Case report

A 38-year-old woman was admitted to the hospital, who had a complaint of abdominal and back pain for about 2 years. She had a history of tuberculosis of cervical lymph nodes in her childhood. Blood biochemistry was mainly normal except for erythrocyte sedimentation rate (ESR) which was 44 mm h<sup>-1</sup>, tuberculin purified protein derivative (PPD-Ab) IgG(+). The computed tomographic angiography (CTA) performed on the abdomen showed a cystic mass with a maximum diameter of 44 mm originating from the abdominal aorta just near the coeliac artery, and the normal

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structure of the coeliac artery disappeared (Fig. 1). Digital subtraction angiography (DSA) confirmed a pseudo-aneurysm of the abdominal aorta involving the neck of the coeliac artery; the distance between the distal ruptured area and the superior mesenteric artery (SMA) was only 15 mm.

Although not proven, the tuberculous pseudo-aneurysm was suspected because of the history of tuberculosis, PPD(+) and increased ESR. The patient was considered unsuitable for conventional open surgery because of high risk and active phase of tuberculosis; therefore, endovascular repair was considered. This patient received classic anti-tuberculous therapy with rifampicin, isoniazid, pyrazinamide and ethambutol, preoperatively.

The procedure was performed in the angiographic suite with general anaesthesia being used. We performed a regular cut-down in the right groin and a longitudinal arteriotomy was made on the femoral artery. An angiogram was performed again to define exactly the ruptured position and localise the orifice of the SMA. The custom-made short stent graft consisted of Ni–Ti Z-segments covered with expanded polytetrafluoroethylene (MicroPort Lifesciences Co, Shanghai, China), which measured 20 mm in diameter and 45 mm in length and was deployed just above the origin of the SMA and excluded the inflow to the pseudo-aneurysm. Post-deployment arteriography showed complete blockage of the coeliac artery orifice with no residual flow to the pseudo-aneurysm sac. The duration of the procedure was 90 min and 120 ml contrast medium was used. After placement of the stent graft, anti-tuberculous medicine (rifampicin, isoniazid, pyrazinamide and ethambutol) was administered.



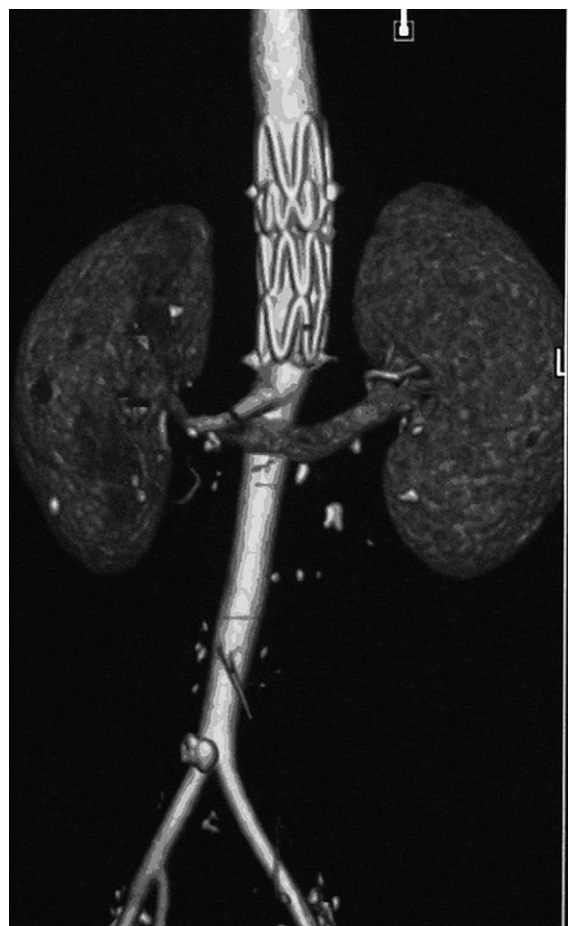
**Figure 1** CTA confirmed a pseudo-aneurysm of the abdominal aorta involving the neck of the coeliac artery.

A repeat CTA scan was performed 30 days after the operation (Fig. 2). The aneurysm's diameter was decreased and was thrombosed; no endoleak occurred and the SMA remained patent. The length of this patient's follow-up is 1.5 years till now and the patient has recovered very well with a weight gain of 3 kg and no microbiological evidence of persistent infection; close attention will be paid to the long-term follow-up.

## Discussion

Tuberculous aneurysm is rare and there are few reports of surgical cases. The signs and clinical symptoms may be poor or minimal in tuberculous pseudo-aneurysm; therefore, a correct diagnosis is not easy. If a tuberculous aneurysm is confirmed, medical treatment should be started without delay. Surgical treatment is necessary in addition to the sensitive antibiotic administration. But the open surgery possesses high surgical risks and mortality (13.3–40%).<sup>2,3</sup>

Endovascular therapy offers many advantages as compared to open surgery, including avoiding extremely hazardous operations in poor surgical candidates and is likely to reduce hospital stay. A treatment by stent graft was tried in successful cases for tuberculous pseudo-



**Figure 2** CTA scan of the abdomen after endovascular exclusion of the pseudo-aneurysm no endoleak happened and the SMA remained patent.

**Table 1** Demographics and study results with EVAR of tuberculous pseudo-aneurysm.

Patient	Age	Symptom	Aneurysm data			Stent graft	Outcome
			Type	Location	Size		
1	42	Abdominal pain and a palpable mass	Saccular aneurysm	SRAA	60 × 50 mm	Z-segments covered with eTEEP (Taewoong Medical, Seoul, Korea)	Aneurysm completely disappeared
2	41	Diffuse abdominal pain	Small aneurysm	IMA	6 × 12 mm	Endovascular stent graft (Vanguard Straight; Boston Scientific)	Aneurysm completely disappeared
3	52	Abdominal pain, fever	Pseudo-aneurysm	IRAA	50 × 40 mm	Endovascular stent graft (MicroPort Lifesciences Co, Shanghai, China)	Aneurysm completely disappeared
4	38	Abdomen and back pain	Pseudo-aneurysm	CA	44 × 14 mm	Endovascular stent graft (MicroPort Lifesciences Co, Shanghai, China)	Aneurysm completely disappeared

SRAA: suprarenal abdominal aorta; IMA: inferior mesenteric artery; IRAA: infrarenal abdominal aorta; CA: coeliac artery.

aneurysm<sup>4,5</sup> (see Table 1). However, a stent graft should be not a good indication for uncontrolled infectious aneurysm. Therefore, effective anti-tuberculous treatment pre- and postoperatively is important for endovascular repair of tuberculous aneurysm.

Usually, the landing zone is to be considered cautiously to insert a stent graft, especially for the lesion nearby the coeliac axis. Although coeliac axis occlusion is usually considered a disaster encountered in occlusive vascular disease, the patient is usually asymptomatic because of rich collateral circulations from the SMA. Syed et al.<sup>6</sup> reported successful endovascular treatment of a coeliac artery aneurysm by coil embolisation. Vaddineni et al.<sup>7</sup> reported the planned coverage of the coeliac artery origin with a thoracic stent graft to achieve an adequate distal sealing zone in 46 patients; no postoperative deaths or ischaemic abdominal complications occurred. Our successful attempt in this case proves that using the stent graft to cover the coeliac artery was safe and suitable in certain situations. To our knowledge, our reports are the first to describe the endovascular stent-graft treatment of tuberculous pseudo-aneurysm, which involves the coeliac artery;<sup>4-7</sup> short-term effectiveness is encouraging, anti-tuberculous medicine are administered as soon as the tuberculous pseudo-aneurysm is suspected and prolonged postoperative anti-tuberculous treatment is also given; hence, the risks of subsequent stent-graft infection is a comparatively an insignificant event. However, the long-term result is unknown, so close post-interventional surveillance appears mandatory.

## Conclusion

Endovascular repair of tuberculous pseudo-aneurysm in combination with anti-tuberculosis medicine therapy may be a life-saving option in patients, especially for poor surgical candidates. Because of the rich collateral circulations from the SMA, deliberate coeliac artery coverage should be considered, which has been proved to be safe and suitable in certain situation.

## Conflict of Interest/Funding

None.

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